

## CLAIMS

What is claimed is:

1. An untwisted polyethylene yarn comprising: a plurality of filaments in essentially parallel array and about 0.5 to 5 weight percent of a water-dispersible binder material covering less than half the surfaces of said filaments; said yarn having a tenacity greater than about 17 grams/denier and a tensile modulus greater than about 300 grams/denier as measured by ASTM D2256, fewer than about 20 entanglements/meter in a scoured state, and having a width satisfying the following formula

$$W \leq 0.055\sqrt{d}$$

where  $W$  is the yarn width in millimeters under a tensile load of 0.01 grams per denier measured on a flat surface, and  $d$  is the yarn denier.

2. The yarn of claim 1, wherein the yarn width satisfies the following formula

$$W \leq 0.040\sqrt{d}$$

3. The yarn of claim 1, wherein the water-dispersible binder material forms about 0.5 to 3 weight percent of the yarn.
4. The yarn of claim 1, having fewer than about 10 entanglements/meter.
5. A woven fabric comprising in majority portion the yarn of claim 1.
6. The woven fabric of claim 5 in a scoured state.
7. A ballistically-resistant woven fabric of claim 5 having at least 5% greater specific energy absorption when impacted with a 9 mm FMJ bullet at its V50 velocity than a woven fabric having the same construction using polyethylene yarns having the same tenacity and tensile modulus but having more than 20 entanglements/meter or being twisted.
8. A ballistically-resistant woven fabric of claim 6 having at least 5% greater specific energy absorption when impacted with a 9 mm FMJ bullet at its V50 velocity than a woven fabric having the same construction using polyethylene yarns having the same tenacity and tensile modulus but having more than twenty entanglements/meter or being twisted.
9. In a process for the preparation of untwisted polyethylene yarns comprising a plurality of filaments in essentially parallel array, said yarn having a tenacity greater than about 17 g/d, a tensile modulus greater than about 300 g/d, and

fewer than 20 entanglements/meter: the improvement comprising applying about 0.5 to 5 wt.% of a water-dispersible binder material so as to cover less than half the surfaces of the filaments during a last drawing step under a tension of greater than about 2 grams/denier.

- 5 10. In a process for the preparation of a very low creep, ultra high modulus, low shrink, high tenacity multifilament polyethylene yarn by:

a) drawing a high molecular weight polyethylene yarn at a temperature within 10°C of its melting temperature to form a drawn, highly oriented polyethylene yarn;

- 10 b) then poststretching said yarn at a drawing rate of less than about 1 second<sup>-1</sup> at a temperature within 10°C of its melting temperature, and cooling said yarn under tension sufficient to retain its highly oriented state; the improvement comprising applying to the yarn about 0.5 to 5 weight percent of a water-dispersible binder material so as to cover less than half the surfaces  
15 of the filaments during one of drawing step a) or poststretching step b) under a tension greater than about 2 grams/denier.

11. The process of claim 9 wherein the water-dispersible binder material is a member selected from the group consisting of a salt of an acrylic copolymer, sodium carboxymethyl cellulose, polyethylene oxide, polypropylene oxide,  
20 ethylene oxide/propylene oxide copolymers, polyvinyl alcohol, modified starch, esterified starch, cationic starch, starch-styrene/butadiene copolymer, and mixtures thereof.

12. The process of claim 10 wherein the water-dispersible binder material is a member selected from the group consisting of a salt of an acrylic copolymer, sodium carboxymethyl cellulose, polyethylene oxide, polypropylene oxide,  
25 ethylene oxide/propylene oxide copolymers, polyvinyl alcohol, modified starch, esterified starch, cationic starch, starch-styrene/butadiene copolymer, and mixtures thereof.

13. A process for the preparation of a ballistic-resistant fabric comprising the steps of:

30 a) weaving a fabric comprising in majority portion the yarn described by claim 1; and

- b) flattening and spreading the yarns in said fabric by additionally applying one or both steps selected from the group consisting of scouring said fabric and calendering said fabric.
14. The process of claim 13 wherein said flattening and spreading step comprises
- 5        scouring said fabric.
15. The process of claim 13 wherein said flattening and spreading step comprises calendering said fabric.